

Review

# Cycling Tourism: A Literature Review to Assess Implications, Multiple Impacts, Vulnerabilities, and Future Perspectives

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**Abstract:** Cycle tourists are increasingly prominent in the profile of world tourism and, in the light of the literature, it is essential, among other things, to examine more closely who they are, what their concerns and motivations are that generate the choice of a cycle tourism product, and, as a priority, the level of economic, social, and environmental impact they cause at destination. In this context, this literature review aims at identifying authors' and publishers' interest in cycle tourism, the positive and negative effects of this form of tourism on the economic environment (direct and indirect), as well as effects on the social environment (benefits and potential drawbacks for local communities, along with health benefits for practitioners) and, last but not least, the degree of vulnerability to economic crises generated by travel restrictions. The conclusions reported in this article, as they have been drawn from analyses and examples of best practice, based on natural and anthropogenic geographical conditions, will be prioritised as future research directions. The usefulness of this approach lies in the information with significant applied and novelty aspects, addressed to local, regional, and national authorities, cycling and cycle-tourism associations, and various private interested enterprises, with a view to promoting cycling for recreational purposes and implementing cycling/cycle-tourism infrastructure as a sustainable way of developing small towns and rural areas with tourism potential.

**Keywords:** bicycle tourism; cycle tourism; cycling; slow tourism; sustainability; social responsibility



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## 1. Introduction

Cycling is, in many contexts and circumstances, an extremely effective, cheap, fast, reliable mode of transport [1] and requires little space or investment in terms of acquisition and operation [2]; in addition, cycling globally presents opportunities for affordable and sustainable transport, promoting a healthy lifestyle [3–5]. Despite the fact that cycling involves less expenditure on the part of the cyclist [6] compared to other forms of tourism (seaside, cruises, etc.), as we will see throughout this article, the value of economic and social impacts resulting from the use of cycling as a means of transport for tourism purposes is potentially very high. In our opinion, cycling should be seen as an important mode of transport, as a forerunner of cycle tourism.

In recent years, many tourists have changed their holiday options. The mass tourism of the 1960s and 1970s and the continuing demand for conventional tourism products have gradually been replaced by more varied and active holidays [7]. We are in no way questioning the loss of the hegemonic position of mass tourism, nor do we support such an assumption. Many of today's leisure tourists want to develop their experiential side, but also to be stimulated, educated, and inspired [8]. Tourists can travel alone or with friends and find more activities in which the whole family can get involved. Cycle tourism, in many ways, meets these requirements. Combining activities such as cycling or hiking with charity and sporting events has become increasingly popular [9]. Equally popular are combinations

between cycle tourism and sports competitions (non-event participants) [10,11], leisure activities and cultural tourism. Organizing a cycling sporting event in a less people-friendly geographical area (Calonchi-Badlands, areas in Basilicata region, Italy) can turn into a multi-day celebration with local food and drinks, becoming an interesting geo-touristic experience [12]. Cycling in an exceptional natural setting, as a means of travel, can be a sensitive barometer indicating the quality of tourists' experience and, therefore, can lead them to prefer a particular destination [7].

Cycle tourism is a booming sector and a form of tourism with an increasing number of people every year [13,14]. This paper identifies some gaps in the literature akin to both the scientometric analysis and the concept of open science from the perspective of cycle tourism. Ergo, even not exhaustively, we identify these missing pieces and, therefore, add a new layer of understanding of the subject in matter. Lastly, we conclude the research by indicating further directions that should be taken into account in this regard. Within this frame of reference, this paper aims to identify the interest of both scientific publications and, implicitly, of the authors in regard to this form of tourism. Following the scientometric analysis, a series of emerging features of cycle tourism have been pinpointed as complementary elements in the design of tourism products that could ultimately lead to sustainability. Further linkages are also mirrored in the literature, as common features between cycle tourism and other types or forms of tourism are being highlighted, especially those that correspond to the same aspiration of promoting principles of social and environmental sustainability. In light of this, we also show the temporal availability of search engines (between 2015 and 2021) agreed upon by the scientific community (Web of Science and EBSCO Discovery Service), in relation to the open-science concept.

Over time, the literature has progressively shown the benefits of cycling related to economic, social and environmental matters. In addition to this, the European Cyclists' Federation (ECF) reveals not only the opportunities of cycle tourism in terms of increasing the number of cyclists, improving collaboration between regions, but also the problems related to excessive pollution caused by the use of highly polluting means of transport, without neglecting the benefits associated with cycling tourism in economic, social, and environmental terms [15]. Closely monitored, reports on the progression of cycling and cycle tourism during the COVID-19 pandemic have also been published by governments and several national cycling associations, as the interest in its benefits is increasing day by day.

Through this research, the paper aims to merge all the ideas mentioned above and conclude to what extent, at a European level, cycling tourism is vulnerable to dramatic economic change, as well as to determine the level or degree of resilience response that comes along due to travel restrictions. Moreover, globally, cycling tourism has a number of internal and external benefits such as: health benefits, congestion-easing due to cycle use, fuel savings due to cycle use, and reduced air and noise pollution due to cycle use [15]. In this context, by reviewing the literature, this paper answers the following basic questions (in addition to the most important topics concerning cycle tourism, such as economic and social sustainability, the main reasons for cycling, benefits for cyclists and national healthcare budgets, and the need to implement new equipment to develop cycle tourism etc.):

1. What are the interests of authors and publishers endorsed by the scientific community in cycle tourism?
2. Does cycle tourism respond to current challenges due to the increasing accessibility needs of tourists, such as reduction in air pollutant emissions and noise pollution?
3. Is cycle tourism less vulnerable to economic and sanitary crises due to travel restrictions (e.g., imposed by the COVID-19 pandemic) than other forms of tourism?

The connotations of issues raised in the introductory section have acted as a catalyser for the implementation of numerous strategies, manuals, and projects aimed at directing efforts towards the development of cycling and, implicitly, bicycle tourism. The successful implementation of these approaches has been, remains and will be an example of best

practice, as well as a reason to identify new trends and improve the complex systems of bicycle tourism, and to develop new themes and directions for future research.

#### *Term Definition*

Given that the interest in the literature on cycling tourism has been extremely high among researchers in the field, as well as among researchers less familiar with this form of tourism, we consider it necessary, for the second category, to make a few clarifications regarding the definition of terms specific to cycling tourism, as found in the literature. Moreover, when undertaking research, the phenomenon under investigation must be clearly defined [16].

Sustrans, a UK charity specialising in sustainable transport, which promotes and provides services, among others, for cycling routes, defines cycle tourism as trips/vacations, whether day or multi-day, away from the tourist's place of residence that involve recreational cycling as a fundamental and significant part of the trip [17]. The Council of Europe's Directorate General for Internal Transport and Tourism Policy defines cycle tourism as follows: cycle tourism refers mainly to leisure cycling and cycling is an integral part of the tourist experience [18]. By the importance of the recreational cycling criterion, the same authors of the European institution's report, as well as the charity Sustrans, further identify and define three main types of cycle tourism: cycling holidays, holiday cycling and cycling day visits [17,18]. In cycling holidays, cycling is the main motivation and purpose of the holiday, and participants are often referred to as dedicated/enthusiastic cyclists. Holiday cycling, on the other hand, involves cycling for recreational purposes but not as the main part of a trip, as this is a secondary role, often taking place in combination with other tourist activities at the destination. Finally, day-trip cycling involves one or more individuals travelling by bicycle for leisure purposes from their place of residence or base accommodation to a particular destination, a journey lasting one day [17,18].

Simonsen et al. define a cycling tourist as a person of any nationality who, during a certain period of a holiday, uses a bicycle as a means of transport and for whom cycling is an important part of that holiday, except for short trips to the "corner shop" [7]. It is important to note that local residents who cycle for recreational purposes are not included in this definition, although domestic cyclists are [19]. Ritchie (1998), makes a significant contribution by defining a cyclist tourist as a person who is away from their home town or country for a period of not less than 24 h or one night, for the purpose of a vacation or holiday, and for whom using a bicycle as a mode of transport during this time away is an integral part of their holiday or vacation. This vacation may be independently organised or part of a commercial tour and may include the use of transport support services and any type of formal and/or informal accommodation [19].

The rationale behind cycle tourism and cyclists is subject to a considerable number of amendments. Thus, from our point of view, a definition that closely matches the current profile of the two terms should imply the introduction of several attributes that contribute to the principles of sustainable development, such as environmentally friendly activities or even roles in and contributions to the regeneration of tourism destinations. Establishing convergent features between cycle tourism and other forms of tourism could, overall, aid tourism operators to achieve a better segmentation of the market. Yet, extensive research is required to validate these claims, which could further lead to new research directions in the future.

Slow travel is a term that refers to travelling to destinations using less polluting means of transport, such as a train [20], and within the destination by walking or cycling [21]. The visitor is encouraged to spend more time in culinary, cultural, and local heritage experiences, preferably by travelling on foot, bicycle or public transport. This sustainable way of travelling offers a richer experience for the tourist and has a lower environmental impact [18].

By reviewing the literature, Lin et al. (2020) discuss the definition of sport tourism and its duality in forms of practice: hard (competitive) and soft (leisure) sport tourism. Cycling tourism is classified under soft sport tourism [22].

## 2. Methodology and Previous Related Work

The way in which this paper was developed follows a general dual approach.

First, a quantitative analysis of scientific papers published by publishers recognised by the scientific community was carried out. The purpose of this approach is to highlight the concern of researchers and publishers for cycling tourism. In the period December 2021, a quantitative analysis of the documents identified by means of search engines was carried out (EBSCO Discovery Service—EDC, Web of Science, Scopus and Google Scholar) using combinations of simple keywords or one-/two-word terms, individually (cycling, cycling tourism, or bicycle tourism). The result was a large number of irrelevant articles. Subsequently, in the period January 2022, the database was expanded with keywords such as: bicycle tourism, cycle tourism, cycling, slow tourism, sustainability, social responsibility, agro-tourism, and green tourism. In this way, the emerging features of cycle tourism were identified. Subsequently, the keyword selection base was narrowed down to: bicycle, tourism, and cycling, which led to a significant improvement in the accuracy of relevant articles addressing the same theme/topic as this paper. From the scientometric perspective, in order to establish the relevance of the articles to the subject of this paper, the presence of keywords in the content of the title of the resulting scientific papers was analysed, as well as the content of the abstract and the introductory section. Detailed scientometrics-based analysis was carried out for the EDC, because the number of articles relevant to the topic identified in this database was significantly higher compared to the articles identified with the search engines mentioned above. Further on, the scientometrics-based analysis revealed a number of articles dealing with issues closely related to bicycle tourism, but also relevant aspects concerning the forerunning stages of these forms of tourism.

The research on publishers' interest in the open-access concept was carried out through a quantitative comparative analysis of articles found on the search engines EBSCO Discovery Service (EDC) and Web of Science Core Collection (WoS). Thus, in a first phase, using the keywords cycling tourism and bicycle tourism (both phrases were entered in the search-filters section), the search process resulted in a very large number of documents on the EBSCO search engine compared to WoS. Since the articles present on the WoS search engine are entirely peer reviewed, for accuracy of information, the peer-reviewed search filter was also introduced in the EBSCO search process, in this case significantly reducing the number of documents.

Secondly, based on the same search method, there were identified and analysed articles that, by their informational content, answer questions of current interest regarding the development of active and sustainable tourism: who the cyclists are; what are their concerns and motivations that generate the choice of the cycling tourism product; what are the positive and negative effects on the economic environment (direct, indirect, and induced), as well as on the social environment; which are the health benefits for cyclists and national healthcare budgets; and which are the vulnerabilities of cycling. In addition, in October and December 2021, and January–March 2022, reports and other types of documents, referring to cycling and cycle tourism, published by institutions such as the European Union, the European Cyclists' Federation, Eurostat and other specialised organisations were analysed.

## 3. Research Findings

### 3.1. Scientometrics-Based Analysis

In the search for articles, using the keywords bicycle, tourism, cycling and the search filters (full text and peer-reviewed), a total of 2472 articles were identified for the search engine's default time period of 1967–2022, of which 2421 were academic journals and 30 were reviews. We will analyse the 2010–2021 time frame divided in three phases (2010–2015, 2016–2019, 2020–2021). The focus of the analysis from 2010 onwards aims to quantitatively

reveal the number of articles published and found in the EDS web platform database, only in a relatively recent time perspective. We are in no way questioning the quality of articles, nor do we see this as a reason to choose the above time frame, whether they were published before or after 2010. In addition, with regard to the method of selecting the type of document, both research and review academic journals were considered, for the same purely quantitative grounds, without taking into account the content analysis of these types of articles (or other types of documents) in a first phase. The search results are inserted in Table 1.

**Table 1.** Number of articles identified on EDS using as keywords: bicycle, tourism, cycling.

Range of Years	No. of Documents	No. of Academic Articles/Reviews	Annual Average of Academic Articles/Reviews
2010–2015	631	608/15	101.33/2.5
2016–2019	873	859/6	214.75/1.5
2020–2021	680	676/0	338/0

The results of the quantitative analysis and scalar periodisation of the documents identified on the EDS web platform, as shown in Table 2, illustrate the disparate interest of publishers in bicycle/cycle tourism. However, there is an increasing trend in publishers' interest in publishing articles on this form of tourism.

**Table 2.** Number of articles and main publishers identified on EDS using as keywords: bicycle, tourism, cycling.

Publishers	No. of Documents Published per Year Range			
	1967–2022	2010–2015	2016–2019	2020–2021
Taylor & Francis	508	171	200	47
MDPI	338	6	114	218
Wiley-Blackwell	172	45	74	23
Spring Nature	151	32	48	48
Sage Publications inc	101	35	14	13
Sagamore Publishing	43	20	13	7
Public Library of Science	62	12	33	17
Emerald Publishing Limited	57	10	27	17
Hindawi Limited	39	1	8	30
Sciendo	55	11	16	28

In addition, in this methodological context, it was considered important to analyse and discuss the concept of open science from the perspective of cycle tourism. In this respect, the EBSCO Discovery Service search engine and the Web of Science Core Collection were taken as reference.

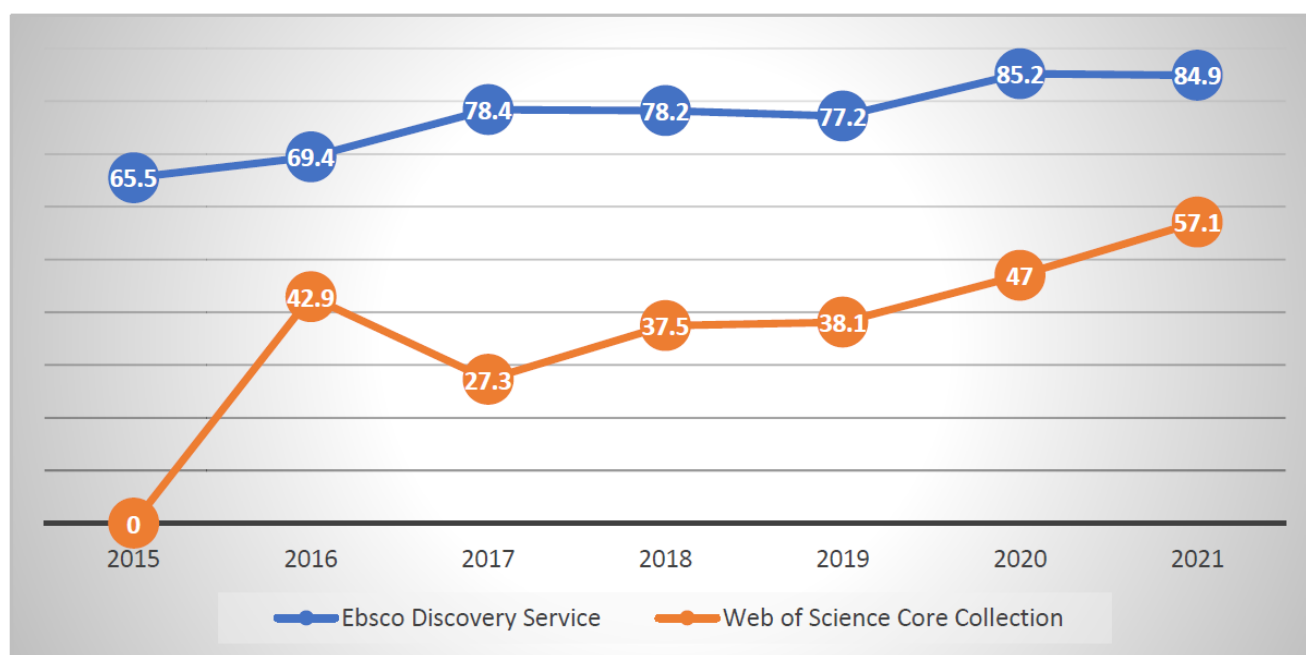
The analysis consisted of accessing these databases using as keywords: bicycle, tourism, cycling and the 2017–2021 time frame, followed by identification of the total number of document types presented and their comparison to the number of open-access/full-text document types, without using the peer-reviewed filter. The results are shown in Table 3.

The percentage evolution of open-access/full-text documents out of the total types of documents identified is shown in Figure 1. This analysis demonstrates that publishers are increasingly interested in open-access/full-text papers found in the EBSCO search engines and the Web of Science database.

Last but not least, documents whose content relates directly to cycling, and, therefore, to cycling tourism, were carefully studied, and here we included: case studies, presentations of conference reports and government documents, European Parliament reports, national and European strategies, manuals and projects to promote cycling.

**Table 3.** Total number of document types and open-access/full-text document types identified on EBSCO and Web of Science search engines using as keywords: bicycle, tourism and cycling in 2017–2021.

Search Engines	No. Types of Documents	Years						
		2015	2016	2017	2018	2019	2020	2021
EBSCO	All types of documents	194	216	241	275	382	453	490
	Open access documents	127	150	189	215	295	386	416
Web of Science	All types of documents	3	7	11	8	21	17	14
	Open access documents	0	3	3	3	8	8	8



**Figure 1.** Percentage evolution of open-access/full-text documents of all document types in 2017–2021.

### 3.2. Emerging Traits

We reiterate unequivocally that tourism activities imply, to a large extent, an interdependence between the types and forms of tourism practised as well as with other areas of activity. Cycle tourism is no exception to this rule, with emerging trends pointing to the re-emergence of cycling as an important mode of transport for recreational and leisure purposes [19]. Therefore, after querying the databases through the EDS search engine, using the keywords mentioned above, a series of emerging aspects of bicycle tourism/cycle tourism were identified, thus making it possible to associate, complement, and include them in the principles of sustainable tourism. In addition, the search process frequently revealed combinations of words such as sustainable (green) tourism, sport (event) tourism, rural (agro) tourism, mobility, slow tourism, etc., in the context of article titles, which leads us to believe that there is a strong link between these forms of tourism, both as forms of practice and common elements of various destinations. Therefore, after analysing a significant number of abstracts of articles relevant to the topic, a number of conclusions have been drawn in this respect.

As far as sustainable (green) tourism is concerned, not only are there emerging features, according to the literature, but cycle tourism is also the main exponent [23] and an integral part of sustainable tourism [24–26]. Gazzola et al. (2018) identify links between sustainable tourism and groups of cycle tourists who prefer to spend their holidays discovering little-known or remote territories [27].

Sport tourism events create a wide range of impacts (tangible and intangible) on the host community, increasing cyclists' motivation to participate in such events [28,29], with cycling being an emerging and complementary element. Sporting events and, therefore, cycling motivate postmodern individuals to focus on protecting their health [30] and behaving in a responsible manner [31]. Specialised travel agencies and organisers of cycling sport events belong to the category of stakeholders directly involved in cycle tourism activity [32].

Mureşan et al. (2019) note cycle tourism as a potential component of agro-tourism development in rural mountain areas [33]. Cycle tourism is becoming increasingly popular as an ideal form of tourism for the development of rural areas [16,34] and contributes significantly to the income of agritourism hosts [35]. On the other hand, the natural attributes of rural locations are well-suited to mountain-bike sport-event tourism and can play a significant role in the strategic development of tourism in new markets [36]. Cycle tourism is becoming increasingly popular and contributes a significant share of tourism revenue. Cycle tourists, as it has been shown, are ideal for the development of not only rural but also peripheral areas [36]. The literature review shows that cycle tourism is closely linked to the culture and distinctive features of the rural community and place, and the attitude and support of residents [37], mediating the behavioural link between perceived cognitive and affective effects [38]. In addition, the results of research by Pavlukovic et al. (2020) indicate that rural residents have a favourable attitude towards cycle tourism, except that the stage of development of this form of tourism in a given area may be an independent predictor of residents' perceptions [39].

In terms of mobility, the bicycle is a means and a form of transport that allows tourists to discover territories in a way that connects them with the environment, with the social dimension, thus obtaining physical and psychological benefits that constitute the basic motivation of the trip [27]. The authors Schlemmer et al. (2019) consider cycling as a recreational mode of transport, also referred to as active mobility, to be of great importance for sustainable mobility [40]. Moreover, promoting the benefits of active mobility is seen as a convergent behavioural change strategy [41] covering several dimensions at the public and individual levels, including positive impacts on health, climate, economy, environment and air quality [42].

Cycling tourism is able to create a strong experiential value, providing direct contact with the culture, history, and traditions of a territory, allowing visitors to enjoy and, at the same time, preserve the environment; from this point of view, this form of tourism falls under slow tourism [27,43]. Another important point worth mentioning in this context is the connection made by Moscarelli (2019) between slow-tourism principles and cycling/cycle-tourism infrastructure. Slow-travel infrastructure (cycling and hiking) connects local areas and regenerates the dispersed heritage of an area and enhances territorial capital (natural, cultural, and human) [44]. Another bridge between cycle tourism, sustainable tourism, and the slow-tourism phenomenon is created by Scandiffio (2021), who shows that tourist involvement initiatives have increased significantly in the last decade, constituting a real healthy alternative to mass tourism [45].

Through their variety, the emerging characteristics of cycle tourism constitute complementary elements that compete in the design of tourism products tailored to the increasingly sophisticated needs of potential tourists eager for an adventure in nature.

### 3.3. Who Are Cycling Tourists?

Cycle tourists travel in search of the traditional characteristics of territories based on tangible and intangible elements for a unique tourist experience that differs significantly from mass-tourism experiences [27].

According to Simonsen et al. (1998), there are three types of cyclists who can be considered as part of the cycle-tourist category: advanced cyclists, able to cope with all travel conditions; intermediate cyclists, mainly teenagers and younger adults, not as

confident in their ability to cope with the journey; and children who are not used to cycling in traffic and are often accompanied and supervised by their parents on the journey [7].

Simonsen et al. (1998) conducted detailed research into the profile of the cycle tourist. Thus, about half of cycle tourists are aged between 25 and 49 years; they are mainly professionally active people; they choose to cycle in pairs or groups of 3–4 people, while the desire to cycle alone is limited; most prefer to change accommodation every day; the average duration of a cycling holiday is between 5 and 14 days; the vast majority of cycle tourists prepare their own food and shop locally, but those who dine in local restaurants are also quite popular; the best representation of cycle tourists are people with secondary education and university degrees; even though cycle tourists have average and above average incomes, they choose cycling tourism on the basis of criteria other than purely economic ones, such as new experiences or the desire to have an active holiday [7].

### 3.4. The Motivations behind Cycle Tourism

The desire of people, active and less active, to exercise outdoors is well-known. Tourists' choices can be considered as a barometer in active-tourism research and a useful tool in the construction of tourism offers [46]. The motivations for choosing a cycle-tourism product differ according to the form of cycling (mountain or road), type of bike used (e-bike or classic), age, gender, etc.

The characteristics of cycling and the related activities derived from it allow the involvement of a segment of populations who, despite their diverse sociological composition, shares similar tastes [47]. Haid et al. (2021) indicate significant heterogeneity among mountain-cycle-tourism practitioners in terms of motivation to practice this form of tourism. Thus, e-bike users are less motivated by the criterion of intensive training compared to those who use classic bicycles; older riders and those with children are motivated by health promotion; an overview of the motivations that determine the practice of bicycle tourism in mountain areas includes outdoor sports activities, unique experiences in nature, action and adrenaline, fun with friends and family, and last, but not least, health promotion [48].

Simonsen et al. (1998) identify two main motivations for choosing a cycling holiday in low-gradient geographical areas, such as being in a natural environment and physical activity [7]. Similar conclusions are revealed in the literature, showing that the main motivational elements include the variety and quality of the natural environment (existence of lakes, rivers, scenic views, biodiversity, untouched natural landscapes, etc.) along the trails crossed [49], as well as spending leisure time in nature with friends in a pleasant way [50]. Another perspective on the motivations for cycling for utilitarian or recreational purposes is the tradition of cycling and the existence of organisations specialised in organising and promoting cycling activities [51]. However, increasing the number of practitioners is highly dependent on adequate infrastructure [52], i.e., roads with low gradients, adequate surface quality, and cycling infrastructure.

According to Lin et al. (2020), the major motivations for young people to engage in active tourism, including cycling, encompass competition, the need for adrenaline and risk taking [22]. According to studies, while sustainability issues are less accepted, saving money motivates some young people, especially students, to consider cycling as a cheap way of getting around [53], even for tourism purposes. On the other hand, middle-aged and elderly people are drawn to cycle tourism by the habits of sports activities (regular physical effort), subjective norms (the influence of the group to which they belong and reference group), and the need for socialization [22].

The existence of marked cycling routes and trails, in addition to the positive economic effects generated, motivates cyclists to visit destinations with such infrastructure and to use cycling as a means of recreational travel [54]. However, even in this context of the existence of cycling routes and trails, adequate infrastructure, i.e., the appropriate quality of riding surfaces and low-gradient roads, becomes an important factor in motivating the choice of a cycle-tourism product [49]. Overcoming the motivational constraint of cycling



on relatively steep slopes has been made possible by the introduction and promotion of electric recreational cycling in recent years [55].

In their research studies, Useche et al. (2019) show that the most frequent factors that encouraged cycling were maintaining health and fitness (38%), contributing to environmental sustainability (14%), reducing expenses (13%), and saving time (10%) [56].

In another vein, the main reasons discouraging cycling were identified as perceived risk of accidents (17%), lack of traffic safety (16%), and bad weather conditions (17%) [56]. On the last point, not only unfavourable weather conditions, but even incorrect weather forecasts can influence cycling traffic values, with a stronger impact on cycle tourism than on utilitarian traffic [57]. One of the most common deterrents identified by utilitarian and recreational bicycle users is the lack of safety of travel [58]. In addition, the main perceived motivational barriers restricting cycling/cycle tourism are a lack of cycling infrastructure and perception of insecurity related to driver behaviour [42].

Even though the results of the studies reported in this context are drawn from the application of statistical methods to respondents, primarily cyclists in general, we can easily assume that there are many similarities between cyclists and cycle tourists in terms of motivation to cycle for recreational or other purposes.

### 3.5. Economic and Social Impact of Cycle Tourism

Increasing accessibility needs of urban and rural populations imply a number of important challenges related to reducing air-pollutant emissions, noise pollution, and traffic congestion [35,59], as well as improving spatial planning by saving land [60]. In addition, on the other hand, the significant reduction in tourism-related jobs [61] due to travel restrictions imposed by pandemic conditions further amplifies these challenges. Neglecting these aspects in a tourism context seriously or irreparably affects, in certain situations, the quality and attractiveness of destinations. Can promoting cycling be a response to these challenges at both national and European levels?

To answer this question, based on the literature, we will review the economic implications and job-creation potential resulting from the promotion of cycling and cycle tourism, for the period 2010–2019, as well as a comparative analysis of the economic situation of global tourism and cycle tourism, on the other hand, for the period 2019–2021.

The literature shows a rapid increase in cycle tourists [62,63]; moreover, this form of tourism is characterised by great diversity, integrity, and multiplicity (through the multiplier effect) [64]; the sector is, thus, changing very rapidly, adapting innovations to social and environmental changes [65]. Cycling-related jobs range from designing and manufacturing bicycles to creating and maintaining jobs in construction and administration [66,67]. In the same vein, the promotion of cycle tourism leads to the creation of various services, resulting in new job profiles such as cycle-tourism guide, mobility manager, etc. [27]. Research findings by Klemmer et al. (2018) indicate that an increase in recreational and domestic bicycle travel contributes significantly to new shops and local businesses in transit areas [68], but also in recreational areas located near cycling facilities [54].

A chronological approach to the economic and social impacts in several countries with a tradition of implementing strategies to promote cycle tourism reveals the perennial evolution of this form of tourism. Cycle tourism has a direct impact on the cycling industry, which has vast economic activity, with approximately 3.7 million new bikes sold (GBP 1.62 billion) in 2010 at 2500 cycle shops across the UK [54]. A study commissioned by the European Parliament (2012) and carried out by the European Cyclists Federation (ECF) estimates that the EuroVelo network itself, once completed, will generate direct revenues of EUR 7 billion each year, making it possible to carry out over 60 million cycling trips [18]. In 2014, the cycling sector was estimated to have around 650,000 full-time jobs (EU-27, excluding Croatia), of which 524,052 jobs were attributed to cycling tourism, and a doubling of the cycling modal share would create a potential of over 1,000,000 full-time jobs, of which 869,927 would be related to cycling tourism [69]. Skinner (2016) states that up to 435,000 additional jobs could be created if 56 large cities followed the same pattern of

action as Copenhagen in promoting and developing cycling [67]. In France, for example, between 2017–2018, the national cycling network was accessed by 16.5 million tourists who generated 10 million stays, representing 90 million overnight stays and an average length of stay of 8.9 nights/stay (compared to an average of 5.3 nights/stay for the main forms of tourism in France) [70]. The ECF conference in Dublin in 2019 discussed issues related to the development of cycle tourism nationally in Ireland, highlighting issues related to the proportion of employees directly involved in the provision of cycle-tourism services, which exceeds the number of employees in agriculture in Ireland [15]. Moscarelli (2019) argues that cycle tourism generates positive impacts; thus, every kilometre of cycling infrastructure in Europe has created and maintains (directly, indirectly, and induced) between 4 and 5 jobs, and in Germany cycle tourism generates revenues of EUR 3.9 billion per year [44]. Thus, it has been calculated that half of cyclists' expenditure is on accommodation, and those on a multi-day holiday spend on average about 64 EUR/day, compared to 16 EUR/day spent by cyclists on a day trip [44]. Coming closer to the present day, Sutton (2020) argues that cycle tourism, from an economic point of view, generates annual revenues of over EUR 44 billion, an amount that is greater than the revenues of the European cruise-ship industry [71]. In summary, for the period 2010–2019, the benefits of cycle tourism quantified by economic and social impacts show major advantages.

Looking back over the same period, according to the World Travel & Tourism Council's Economic Impact Reports (2021), before the pandemic, the travel and tourism industry (direct, indirect, and induced impact) accounted for about 25% of all new jobs created globally, 10.6% of all jobs and 10.4% of overall US GDP. International visitor spending amounted to USD 1.7 trillion in 2019 (27.4% of global services exports), and tourism was cited as one of the most important economic sectors that grew by about 3.5% in 2019, outpacing the global economy's growth of 2.5% [61]. Thus, the tourism industry is experiencing significant growth in both economic and social benefits.

The Economic Impact Reports (2021), published by the prestigious World Travel & Tourism Council, reveals, in addition to the above, the following economic issues related to the travel and tourism sector (TTS): in 2020 the contribution of TTS to GDP decreased by 49.1% compared to 2019, compared to a 3.7% decrease in the GDP of the overall economy; in 2019, TTS contributed 10.4% to global GDP and the share decreased to 5.5% in 2020; during 2020, the number of jobs in the sector decreased by 18.5% compared to 2019; domestic-visitor spending decreased by 45%, while international-visitor spending decreased by 69.4%, compared to the same period [61].

It is easy to see the vulnerability of the tourism industry to the economic downturn. Economic losses in the tourism industry due to pandemic conditions are primarily caused by globally imposed mobility restrictions. The significant reduction in revenues for tourism businesses noted above, but also the threat of job losses, persists, as in such a situation the tourism sector is kept afloat by the application of time-limited government subsidy schemes.

Are there any forms of tourism that are an exception to this rule and less vulnerable to economic crisis conditions? To answer this question, we will look carefully at an important service category of tourism sector, namely, at cycle tourism, known as the practice of travelling by bicycle for recreational purposes. The resulting sample will be embedded in a model of the economic and social environment and will be applied at different scales of geographical representation, which can reveal an overview of the levels of impact created for tourism at various stages of economic evolution or involution.

As shown throughout this paper, the sustained growth in modal shares of cycling for tourism purposes, for example between 2010 and 2019, follows the trend of tourism growth worldwide, but to different extents. In relation to the same trend indicator, the COVID-19 pandemic crisis period of 2020–2021 (an uncertain situation also looms over 2022) has significantly changed consumption habits, giving cycle tourism an anisotropic path compared to the tourism industry. Literature, reports from governmental institutions and associations, and Eurostat statistics reveal important data on the cycle-tourism trend during this period.

Thus, even under the restrictions imposed on companies, Eurostat (2021) estimates that around 12.2 million bicycles were produced in the EU in 2020 (from approximately 1500 bicycles in Denmark up to over 2.1 million bicycles in Italy and over 2.6 million in Portugal.), representing an increase by 1.2% compared to 2019 [72].

In the UK, 2020 was an unprecedented year; at the height of the pandemic, the UK's cycling infrastructure was accessed by 4.9 million users and 764.8 million journeys were made, 121 million more journeys in 2020 than in 2019 (643.8 million journeys), an increase by 19% [73].

France's national cycling network, managed by Vélo & Territoires, saw an increase in the number of cyclists in 2020 by 15% compared to 2016 and 11% compared to 2019 (+13% compared to 2019 in urban areas; +4% compared to 2019 in periurban areas; +5% compared to 2019 in rural areas) [70]. The report *Analyses des Données de Fréquentation Cyclable 2020* by Vélo & Territoires shows an increase in cycling by 13% for utilitarian purposes and 7% for leisure purposes in 2020 compared to 2019, even under conditions of restricted mobility and social distance [74].

Germany's largest cycling club, the Allgemeiner Deutscher Fahrrad Club (ADFC), which has over 200,000 members, published a 2020 study on cycling in Germany. The results? The number of first-time cycle tourists increased by 51% in 2020 compared to 2019 (+1.8 million cyclists); 4.4 million Germans took cycling trips of up to 2 days in 2020 and 82% of first-time cyclists were very satisfied with their trip and say they would recommend it to others; more than 69% of cycle tourists are planning a stay in 2021; almost 60% of Germans took at least one leisure cycle ride in 2020 (11% for the first time), an increase by 41% compared to 2019 [75].

In Norway, the level of cycling increased by 11% in 2020 compared to 2018, with significant national geographical differences (southern Norway saw a 23% increase, while the north saw an 8% decrease) [76].

The year 2021 confirms the upward trend in cycling, in general, and cycling tourism, in particular. EuroVelo, Europe's largest cycling network, reports a 5% increase in the number of users for 2021 compared to 2019, and an important aspect in this context is the significant increase in weekend use of the network by 14%, suggesting the popularity of recreational cycling during the pandemic [77].

In conclusion, in the light of what has been reported, the literature categorically indicates that cycling tourism has increased significantly during the sanitary crisis compared to the peak year 2019 and that cycling tourism has become a desirable form of tourism in terms of the market, both demand and supply.

On a different note, but keeping in context, the economic benefits of promoting cycling tourism can also be quantified in other ways. For example, in addition to the UK cycling network contributing GBP 2.5 billion to local economies annually, it benefits the UK economy by reducing road congestion by around GBP 88 million [78]. Furthermore, in 2017, the health benefits associated with recreational and utilitarian cycling were quantified as preventing 630 premature deaths and avoiding nearly 8000 serious long-term health conditions [78]. The economic benefits, at an EU-Member-State level, were attributed to cycling through its positive effects on: healthcare budgets, reduction in traffic congestion, fuel savings, reduction in CO<sub>2</sub> emissions, and reduction in air pollution and noise pollution, which are quantified at EUR 205 billion [79].

Another perspective on the social impact of tourism, in general, and cycling tourism, in particular, derives from the current trend in perceived social responsibility of both demand and supply. Tourists are increasingly interested in social responsibility, wanting to see socially responsible tourism organisations [80], although the paradox is that they, as consumers, do not always choose the product or service responsibly [65].

### *3.6. The Impact of Cycling on the Health of Cyclists*

As shown in this paper, by reviewing the literature, the main motivations that determine the choice of a tourism product or destination by cycle tourists differ according

to the area analysed, age, culture, consumption habits, etc. If, in the opinion of Yeh et al. (2019), the main motivation is the quality of the natural environment [81], Haid et al. (2021) consider the promotion of health as the most important reason for a cycling holiday, particularly for elderly people and people with children [48]. Regardless of the motivational scale, cycling has a wide range of benefits: it keeps people fit and improves their health, and helps prevent and combat obesity, cardiovascular diseases, reduces premature mortality [79]. In the same vein, on the one hand, the health benefits to practitioners are revealed through increased levels of physical activity that can improve physical and mental health [82] and, on the other hand, more attention needs to be paid to the results of widespread cycling, which brings significant savings to national healthcare budgets in the medium and long term [83]. In addition to the health benefits, cycling green in different ways, such as in large or small groups of people, or with friends or family, will help shape the image of the future destination as a green destination based on sustainable development principles [63].

Physical activity is associated with a 30% reduction in mortality for all cases, as well as a reduction in all long-term health risks except respiratory problems, contributing between 20 and 40% to maintaining energy balance, functional health, and metabolic balance [54].

Some comprehensive studies carried out in Finland on 48,000 subjects found that cycling for a minimum of 30 min every day was associated with a significant reduction in the risk of developing type-2 diabetes and a low rate of obesity, has a protective effect against the development of coronary heart disease (a leading cause of mortality globally), and significantly reduces the risk of developing cancer, resulting in a low mortality rate [84].

Stasna et al. (2018) stated that there are clear causal associations between increased physical activity and reduced mortality from cardiovascular diseases, high blood pressure, obesity, diabetes, respiratory diseases, certain types of cancer, and musculoskeletal (bone) and mental health problems [83]. There is also some evidence of specific health benefits of cycling, such as reduced body weight, including reduced mortality among cyclists [83]. Compared to walking or running, cycling puts less stress on the joints of the legs. Thus, according to Nordergen et al. (2021), cycling as a mode of travel appears to improve health more than walking, as cycling appears to reduce the risk of cardiovascular diseases and associated risk factors. In addition, the health benefits of cycling have been shown to outweigh the risk of injury and mortality [76]. Mateo and Sanz (2021) reiterate the assertion that cycling has a positive impact on health, reducing obesity rates, improving cardiovascular health and reducing morbidity; even taking into account the potential risks caused by cyclists' accidents in traffic, the health benefits are significantly positive, being enhanced by increased cycling levels [24].

The health benefits of cycling during a holiday generate potential associations, such as the correlation between spending an active holiday and mobility patterns at home [40]. In this context, the image of the destination visited, as well as the type/form of tourism practised, are important. The possibility of a change in daily behaviour after returning from an active cycling holiday may lead to an increase in walking or cycling at the place of residence, but after a summer holiday (e.g., all-inclusive) we can assume that the degree of sedentariness may increase.

Cycling has, therefore, the potential to improve both individual and social health. Quantifying the health benefits attributed strictly to cycling is methodologically difficult. The particularities of cycling and cycling tourism are very similar; that is why aspects of health benefits resulting from cycling as a general mode of travel (utilitarian and recreational) will be attributed to cycling tourists.

### 3.7. The Vulnerabilities of Cycling Tourism

Due to common features, cycling vulnerabilities can also be attributed, to a large extent, to cycling tourism. The vulnerabilities of cycling for domestic or recreational purposes can be addressed through the exposure of cyclists to traffic accidents (the parties involved can be car drivers and cyclists, cyclists and cyclists, or cyclists only), exposure to polluted air

while cycling, exposure to various diseases due to excessive physical effort made by people with health problems, etc.

Cycling can be dangerous because of the possibility of falling, inattention in traffic, inadequate infrastructure, and technical problems with the bike. People who use bicycles for utilitarian or recreational purposes, while improving their personal health and reducing traffic congestion and pollution, are vulnerable to many risks, such as making journeys in an urban environment with polluted air and noise, and injuries caused by collisions with other road users (perceived traffic risk) [58]. The study by Watson et al. (2015) reveals that half of the cyclists included in the study were injured in an accident involving a single person [85]. Statistics Netherlands, in the Transport and Mobility report (2016), indicates that the number of people seriously injured in the Netherlands increased between 2010 and 2015, particularly among cyclists and pedestrians, and that the most vulnerable people are older cyclists [86].

According to a report (Road Safety Annual Report 2020) published by the Organisation for Economic Co-operation and Development (OECD) and the International Transport Forum (2020), cycling fatalities are relatively low compared to other modes of travel, but annual fluctuations can generate large percentage changes [87]. In absolute numbers, between 2010 and 2018, cycling fatalities increased in countries such as Ireland (from five to nine) and Norway (from five to seven) [88]. By comparison, the number of cyclists killed in 2018 was nine in Lithuania, five in New Zealand and eight in Slovenia. It should be borne in mind that the data provided are recorded against a background of significant increases in modal shares of cycling [81] within the same period of time.

The emergence and accessibility of new forms of recreational mobility, such as electric bicycles, brings new road-safety challenges [88]. The Road Safety Annual Report (2020) reveals that accident statistics, globally or nationally, do not yet show a clear distinction between these new forms of mobility, but a large number of countries have recorded new types of accidents involving these mobility devices [87].

As far as road traffic accidents involving cyclists are concerned, an accurate assessment imposes certain limitations, which are difficult to achieve due to shortcomings in the reporting of these events by the competent authorities. In Denmark, for example, Watson et al. (2015) indicate under reporting at around 90%, which means that the police, for a number of different reasons (under reporting and bias of medical records by hospital staff), only record around 10% of actual bicycle accidents [85].

Cyclists, in the opinion of Nicolik et al. (2006), due to the intense physical effort and unpredictable weather conditions to which they are subjected, should pay particular attention to prior medical examinations, and cycling touring products should include medical assistance services on the route and a reasonable time window for intervention in the field [89]. Such an approach can significantly reduce the level of medical vulnerability to which some practitioners are exposed.

The relatively high seasonality of cycle tourism points to a number of vulnerabilities regarding the relationship between this form of tourism and the potential of its economic impact [90], with repercussions on the revenue of the offer at destination, which may lead to certain reservations when making investments in infrastructure and dedicated services.

#### 4. Discussion and Future Research

As the literature shows, it is important to note the growing popularity of cycle tourism, particularly with its focus on economic and social development at different geographical scales (local, national, and regional). Researchers are paying particular attention to this form of tourism due to new challenges posed by increasing accessibility needs and behavioural changes resulting from travel restrictions imposed by pandemic conditions. In addition, the trend to reduce emissions of air pollutants from highly polluting means of transport is increasing scientists' interest in identifying new environmentally friendly travel patterns. The promotion of cycling for leisure and recreational purposes responds favourably to these challenges.

There is a growing trend in publishers' interest in publishing research articles on this form of tourism. However, the interest of publishers in review articles does not follow the same trend, with the annual average decreasing significantly year on year. From a scientometrics-based point of view, the role of review articles is to quantify, through quantitative analysis, the volume of scientific articles in a given field and, on the other hand, through qualitative analysis, the state of research carried out at a given time on a specific subject. Subsequently, the analysis of the reviewed articles determines the interest of researchers in a given field and identifies future research directions. Literature reviews play an undeniable role in significantly facilitating these processes. The downward trend in authors' and publishers' interest in review articles may be leading to new research directions.

From the reviews carried out, it appears that the variety and multitude of features shared with other forms and principles of tourism, through emerging perspectives, positions cycle tourism in the sphere of economic, social, and environmental sustainability. The motivations behind these forms of tourism (cycle tourism, associated and complementary recreational activities) have many similarities, mainly, concern for environmental protection. Whatever the motivational scale, cycling has a wide range of benefits: it keeps people fit and improves their health, helps to prevent and combat obesity and cardiovascular diseases, and reduces premature mortality, which in the medium and long term brings significant savings to national healthcare budgets. Cycling, therefore, has the potential to improve both individual and societal health.

The presentation in this paper of the motivations that lead tourists to use bicycles as a means of travel are absolutely necessary factors in designing tourism products based on tourists' preferences, which are constantly and dynamically changing. Specialised travel agencies, tourism associations and the relevant ministries are directly involved in quantifying the motivational information needed to direct efforts in developing regeneration strategies for certain tourist destinations.

The information provided in this paper, through a review of the literature, leads us to the idea of the vulnerability of the tourism industry to periods of economic downturn, caused primarily by global mobility restrictions. Thus, the significant reduction in revenues of tourism businesses, as well as the threat of job losses, are definite causes for concern that require further in-depth research to overcome such challenges.

Cycling tourism makes a positive contribution to national economies and is a worthwhile investment. The literature review reveals a number of benefits resulting from the promotion of cycling, associated attributes and cycling tourism: reduction in car congestion; improvement in public health and savings to national healthcare budgets; creation of jobs in different sectors of activity (local and national), generating direct, indirect, and induced income; contribution to the development of the local economy and last, but not least, as a particular feature, enhancement of territorial capital (natural, cultural and human). In this conclusive context, the impacts generated at different levels lead us to state that cycle tourism is a form of tourism that is less vulnerable to economic crises, showing greater resilience. The results of the literature review are conclusive in this regard. This state of affairs calls for a broad approach to the causes and effects determined, as centripetal issues converging towards new research directions. The corollary of these analyses can direct efforts towards the development and implementation of tourism products based on the concept of sustainability on both the demand and supply side.

The alarming rate of the depletion of natural environmental resources requires unprecedented changes in the repositioning of economic and social values and priorities. Social responsibility, therefore, has become the watchword. The contribution of the information provided in this paper shows the importance of cycling tourism at different levels, from both economic and social responsibility perspective. The latter aspect forces tourism service providers and tourism demand to pay more attention not only to the commercial aspect (profit), but also to corporate social responsibility (supply side) and responsible con-

sumption (demand side). Social responsibility also needs more attention from researchers and is seen as a future priority area for research.

In the literature, aspects related to the benefits of cycling, on multiple levels, in times of health crisis (in this case generated by COVID-19), are not revealed in an aggregated view. In most cases, the results are attributed to a specific territory belonging administratively to a nation. Some countries, through relevant institutions and specialized organizations, have carried out research and published reports highlighting the evolution and/or decline in this form of tourism from an economic, social and environmental point of view.

The purpose of this review paper is to synthesise this information and highlight its extremely important attributes. Examples in this context are the increase in the number of cycle tourists in conditions of health crisis and the resilience of this form of tourism. The contribution of this work to the tourism literature is to reveal, not just punctually, but deductively, by bringing this information together. The results show very clearly that the benefits of promoting cycle tourism and implementing infrastructure lead to the generation of global benefits on multiple levels, not just punctually, in specific countries and regions.

In the data-collection process, there were also some limitations in terms of the consistency and relevance of the information provided in this paper. Thus, some reports on the state of cycling during the health crisis were published in languages other than those in international circulation, and some countries did not produce such reports or information. This led to a certain level of restrictiveness in the data-analysis process and, hence, the level of economic, social and environmental impact. Bearing in mind that these situations occurred in a limited number of cases, under these conditions, we can easily assume that the upward trend in the value of cycle tourism is undeniable.

The implementation of measures to promote cycle tourism requires a concerted effort on the part of specialists; local, regional, and governmental administrations; associations; and private companies. Success is assured when as many stakeholders as possible are involved, inspired by a clean future.

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